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PROTECT GRAIN CROPS from STEM RUST



U. S. DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND
PLANT QUARANTINE

DIVISION OF PLANT DISEASE CONTROL

BARBERRY GROWING NEAR GRAINFIELD



BUSHES GROW IN MANY LOCATIONS

COMMON BARBERRY BUSHES, brought from Europe to America by the Colonists, were carried westward by the early settlers and planted for ornamental and hedge purposes in cities and on farms. From these comparatively few planted bushes seeds were widely scattered by birds and other agencies to woodlots, fence rows, river banks, and other uncultivated lands where they became established and continued to spread.

Like many other crop pests, barberry bushes multiply rapidly under a wide variety of soil and climatic conditions.

QUESTIONS AND ANSWERS

1. What is stem rust?

Stem rust is a disease of wheat, oats, barley, rye, and many grasses, caused by a tiny parasitic plant called a fungus.

2. Is there more than one kind of rust that attacks small grains?

There are several different kinds of rust that attack grain plants, the most common of which are orange leaf rust, stripe rust, crown rust of oats, and stem rust. The common barberry is the spring host for only stem rust.

3. Does weather cause stem rust?

Stem rust increases rapidly during warm, damp weather, but the disease does not occur unless spores of the rust fungus are present to cause infection.

4. Will seed treatment control stem rust?

Seed treatment aids in controlling smut and certain other cereal diseases, but it has no effect on rust.

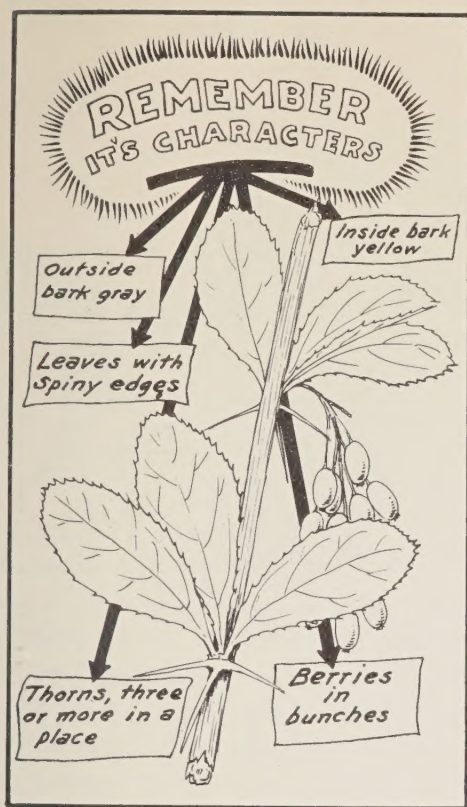
5. Is the barberry the only shrub known that spreads stem rust?

Hundreds of different rusts may be found attacking as many different kinds of plants, but only certain susceptible species of barberry harbor the stem rust of small grains.

6. Will burning infected straw and grasses control stem rust?

Burning old straw, stubble, and dried grasses does not help to control stem rust.

IT'S A HARMFUL BARBERRY



BARBERRY EASILY RECOGNIZED

THE RUST-SPREADING BARBERRY can be readily distinguished from other shrubs, although it may vary in size from a seedling of a few inches to an old bush 18 feet tall. The average height is from 3 to 6 feet. Regardless of size or age, barberries can be easily identified if one remembers the characters illustrated above.



THE JAPANESE BARBERRY, so commonly grown for hedge and other landscaping purposes, is not attacked by stem rust and should not be destroyed. It has leaves with smooth edges, the outer bark is reddish brown, and the berries grow singly or in two's.

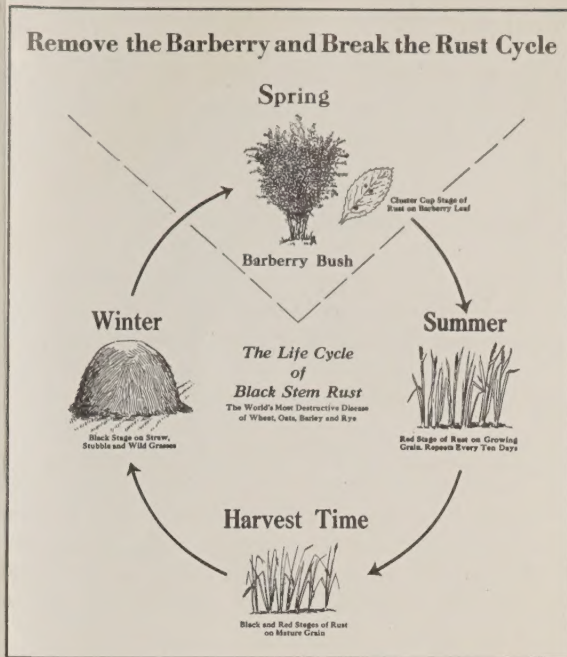
Two Important Sources of Stem Rust

1. RUST FROM BARBERRY

Rust-infected barberry bushes are an important source of stem rust in the Northern States. From these bushes the disease spreads to nearby grains and grasses during late May and early June. If weather favors the spread of rust these local centers of infection often develop into destructive regional epidemics before the grains mature.

Stem rust spreads from the barberry to grain and from one grain plant to another by means of spores which function in a manner comparable to the seeds of larger plants.

When prevailing weather is warm and moist a new generation of rust spores may be produced every 6 to 10 days while the grain plants remain green. Each succeeding generation of spores greatly increases the prevalence and severity of the disease.



STEM RUST LIVES ON BARBERRY IN SPRING

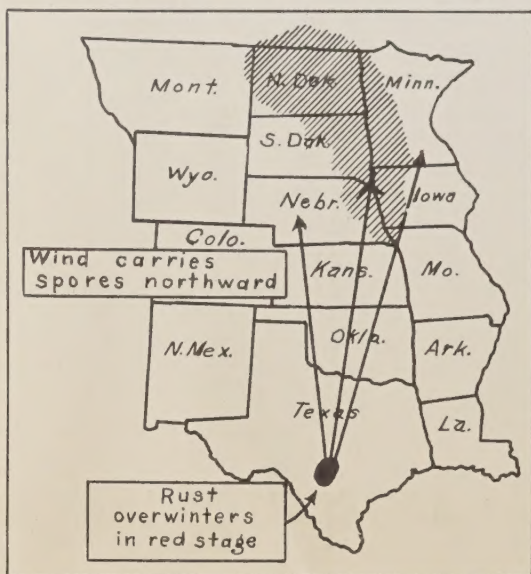
As illustrated above, there are three distinct stages in the annual life cycle of the stem rust fungus. The germinating black or winter spores can attack only the leaves of barberry bushes. The spores produced on the barberry in turn infect the new grain crops, producing once more the red or repeating stage of the disease.

In southern Texas and in Mexico the summer stage of stem rust often lives through the mild winters on green grain and grasses. Under such conditions stem rust may survive from one growing season to the next without the aid of the barberry.

2. RUST FROM THE SOUTH

Under certain conditions rusted grain in the far South may constitute a second important source of rust infection for crops in the Northern States.

Infection from this source, however, reaches the spring wheat States too late in the season to cause extensive damage unless: (1) Stem rust is prevalent in Texas and neighboring States early in the spring, (2) winds from the South prevail during June, (3) wind-borne spores reach northern grain fields several weeks before the crops mature, and (4) weather conditions in the North favor the rapid spread of the fungus once infection takes place.



New Strains of Stem Rust Produced on Barberry

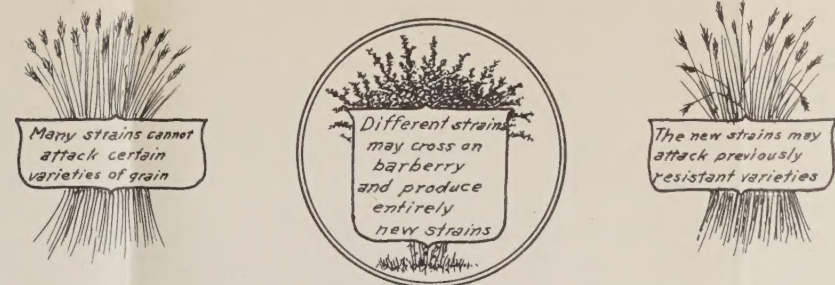
MANY VARIETIES and strains of small grain are grown in the United States. Some of these vary widely in appearance, ability to yield, resistance to disease, and in other qualities. Some are well adapted to certain regions but cannot be grown successfully in others.

Plant breeders develop new varieties of grain by cross breeding and by selecting carefully the desired types of plants. A great amount of time, effort, and skill is required to produce a new variety suitable for commercial use, and continued effort along this line is necessary to improve further the quality, yield, and disease resistance of all kinds of cereal crops.

RUST DAMAGE COSTLY TO GRAIN GROWERS

Although stem rust ordinarily does not appear until after the principal cost of production has been incurred, it may completely destroy an otherwise normal crop during a brief period of 2 to 3 weeks just prior to harvest. Local outbreaks of stem rust, causing severe damage, occur somewhere in the United States every year.

More than a hundred parasitic strains of wheat stem rust are known. Each strain can attack some wheat varieties but not others.



The eradication of barberry bushes susceptible to attack by the stem rust fungus prevents the production of new destructive strains of the disease.

COMPLETE ERADICATION NECESSARY

Complete eradication of all rust-susceptible barberry bushes in the northern grain-growing States is necessary for several important reasons:

1. To reduce the number and severity of early destructive epidemics of stem rust.
2. To prevent the production of new strains of rust that may attack varieties of grain that are now resistant.
3. To guard against the return of barberries to areas where control work has been completed.

THERE ARE SEVERAL different varieties of the stem rust fungus, each of which is made up of many different races. One variety infects wheat and barley; another grows only on oats; while still another attacks only rye and barley. Certain varieties of wheat may be highly resistant to some races of the rust fungus and very susceptible to others.

As illustrated above, existing races of the stem rust fungus may cross at the time infection occurs on the leaves of a barberry, producing an entirely new physiologic race which may attack varieties of grain that for several years have proved highly resistant to the disease.

STEM RUST AN OLD PROBLEM

For centuries grain growers have had to contend with the stem rust problem. For more than 200 years local groups of farmers have practiced barberry eradication as a rust control measure. During the past 25 years many of the important grain-growing countries of the world have undertaken regional barberry eradication programs to protect grain crops from stem rust.

== MAKE IT A HABIT TO LOOK FOR AND REPORT HARMFUL BARBERRY ==

LOSSES FROM STEM RUST CAN BE REDUCED

THE FOLLOWING FARM PRACTICES constitute an essential part of the program for control of stem rust:

1. Destroy all rust-susceptible barberry bushes in the important grain-growing States.
2. Sow rust-resistant varieties of grain recommended by your State agricultural college.
3. Sow spring wheat just as early as soil can be properly prepared.

Stem rust must be prevented, as it cannot be successfully controlled once it becomes prevalent in a field of grain.



BADLY RUSTED FIELDS YIELD LIGHT-WEIGHT AND POOR-QUALITY GRAIN

PROGRESS MADE IN BARBERRY ERADICATION

SINCE 1918, more than 171 million rust-susceptible barberry bushes have been destroyed on 114,472 different properties in the 17 States cooperating in the stem rust control program.

Eradication work has progressed rapidly since 1933 when funds appropriated under the first Emergency Relief Appropriation Act became available for expanding crop pest control activities. Prior to that time barberry bushes in some areas were re-seeding faster than they could be destroyed with the limited Federal and State facilities available for the purpose.

The eradication of barberry bushes in the northern part of the United States is administered by the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, in cooperation with the various State departments of agriculture, State agricultural colleges, and other agencies.

REPORT BUSHES WHICH YOU THINK
ARE BARBERRIES TO YOUR COUNTY
AGENT OR TO YOUR STATE LEADER OF
BARBERRY ERADICATION IN CARE OF
YOUR STATE AGRICULTURAL COLLEGE

